REMARKS

§ 101 REJECTIONS

Claims 12-19 were rejected under 35 U.S.C. § 101 because the claimed invention was said to be directed to nonstatutory subject matter. In particular, the claims were said to be drawn to a program per se because of the phrases "or any other medium which can be used to store the desired information and which can be accessed by computer 110," "or other optical media," and "and the like" found in the Specification suggest that the medium can be carrier waves. In an interview held on July 8, 2008, the Examiner indicated that this rejection could be overcome by deleting these phrases from the Specification. With the present amendment, these phrases have been deleted. As such, claims 12-19 are not drawn to a program per se but instead are drawn to statutory subject matter of a computer storage medium.

§ 103 REJECTIONS

CLAIMS 1, 3-6, & 9-11

Claims 1, 3-5, and 8-11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Frey et al. (Publication entitled "Algonquin: Iterating Laplace's Method to Remove Multiple Types of Acoustic Distortion for Robust Speech Recognition," hereinafter Frey) in view IEEE Transactions on Acoustics, Speech, and Signal Processing Vol. ASSP-27, No. 2, April 1979, pages 114-120, hereinafter IEEE Publication. Claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Frey in view of IEEE publication and in further view of Ephraim (IEEE Publication, A Bayesian Estimation Approach for Speech Enhancement Using Hidden Markov Models, hereinafter Ephraim).

Claim 1 provides a method of identifying clean speech signal from a noisy speech signal. The method includes identifying a set of log-magnitude frequency values for each of a plurality of frames that represent the noisy speech signal. The log-magnitude frequency values of the noisy speech signal are filtered to smooth the log-magnitude frequency values over time to form

filtered noisy values. This filtering is performed by applying the log magnitude frequency values of the noisy speech signal to a Finite Impulse Responsive Filter having a set of filter parameters wherein at least one of the filter parameters of the set of filter parameters differs from another of the filter parameters of the set of filter parameters. Parameters of at least one posterior probability distribution are determined based on the set of filtered noisy values without applying a frequency-based transform to the set of filtered noisy values. The posterior probability distribution provides the probability of a log-magnitude frequency value for a clean speech signal given a filtered noisy value. The parameters of the posterior probability distribution are used to estimate a set of log-magnitude frequency values for a clean speech signal. The log-magnitude values for the clean speech signal are then used to produce an output clean speech signal.

With the present amendment, the limitation of claim 8 has been added to claim 1 and has been further limited based on page 13, lines 2-9, of the Specification which indicate that the Finite Impulse Response filter under one embodiment has filter parameters of (0.25 0.5 0.25).

As amended, claim 1 is not shown or suggested in the combination of Frey and IEEE Publication. In particular, neither reference shows or suggests applying log magnitude frequency values of a noisy speech signal to a Finite Impulse Response Filter having at least one filter parameter that differs from another filter parameter.

In the Office Action, the magnitude averaging discussed on page 114, paragraph E, and page 116, paragraph D, of IEEE Publication was cited as showing the smoothing of log magnitude frequency values of a noisy speech signal over time. As shown in paragraph E on page 114, this averaging is a simple average and is not the application of the log magnitude frequency values to a Finite Impulse Response Filter.

In addition, those skilled in the art would not replace the magnitude averaging found in IEEE Publication with a Finite Impulse Response Filter having a filter parameter that differs from other filter parameters. Under IEEE Publication, the spectral error is noted as being the difference between the instantaneous noise spectrum and its mean value determined during non-speech. To reduce this spectral error, IEEE Publication attempts to average the noisy speech signal over a number of frames. This has the effect of averaging the noise over a number of

speech frames thereby reducing the effects of any one frame that has a spike in noise. This averaging is most effective when each frame in the average is weighted equally. Unequal weighting of the frames will allow more of a noise spike to come through at certain times thereby increasing the spectral error.

This is substantially different from using a Finite Impulse Response Filter having a filter parameter that differs from another filter parameter. Under such a filter, frames with a larger filter parameter value are given more weight than frames with a lower filter parameter value. Those skilled in the art would not replace the equally weighted average of IEEE Publication with the unequally weighted Finite Impulse Response Filter of claim 1 since it would increase the spectral error and limit the effectiveness of the magnitude averaging discussed in IEEE Publication. As such, claim 1, and claims 3-6 and 9-11, which depend therefrom, are not obvious from the combination of Frey and IEEE Publication.

CLAIMS 12-19

Claims 12-16, and 18-19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Frey in view of IEEE Publication. Claim 17 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Frey in view of IEEE Publication and in further view of Ephraim.

Independent claim 12 provides a computer-readable storage medium storing computer-executable instructions for performing steps. The steps include applying values that represent frames of a noisy speech signal to a Finite Impulse Response filter having a set of filter parameters wherein one of the filter parameters of the set of filter parameters differs from another filter parameter of the set of filter parameters to provide time-based filtering and to produce filtered values representing noisy speech. A posterior probability is determined based on the filtered values, wherein a frequency-based transform is not applied before the filtered values are used to determine the posterior probability. The posterior probability provides the probability of frequency values for a clean speech signal given the filtered values. The posterior probability is used to estimate a frame of a clean speech signal and the frame of the clean speech signal is used to produce an output clean speech signal.

With the present amendment, claim 12 has been amended in a similar manner to claim 1 above. For the reasons discussed above for claim 1, claim 12 is not shown or suggested in the combination of cited art. In particular, none of the cited art show or suggest applying a noisy speech signal to a Finite Impulse Response Filter having one filter parameter that differs from another filter parameter. As such, claims 12-19 are patentable over the cited art.

CONCLUSION

Based on the above remarks, claims 1, 3-6, and 9-19 are in form for allowance. Reconsideration and allowance of the claims is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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